

REMARKS

Claims 1-16, 18-32, 34-38, 40 and 41 are pending in the Application and are presented for examination. Claims 17, 33 and 39 have previously been cancelled without prejudice and without disclaimer of subject matter. Claims 1, 4, 7, 11, 14, 18, 28, 36, 40 and 41 are independent. Claims 18-32, 34 and 35 are allowed.

Applicants thank the Examiner for the courtesies extended to Applicants' representative during the telephonic interview conducted on October 8, 2009. Applicants' representative discussed the differences between the applied references and independent Claims 1, 4, 7, 11, 14, 36, 40 and 41. The substance of the discussion is presented below within the context of Applicants' addressing the current claim rejections.

Rejections under 35 U.S.C. §103

On page 5 of the Office Action, Claims 1 and 11 are rejected under 35 U.S.C. §103(a) as being obvious over ten Brink (U.S. Patent #: 6,611,513) in view of Stein (U.S. Patent #: 6,175,590) and further in view of Dent *et al.* (U.S. Publication #: 2003/0036359). Applicants respectfully traverse this rejection.

Independent Claims 1 & 11

Independent Claims 1 and 11 recite, among other things, a "symbol de-mapper being adapted to perform symbol de-mapping on said sequence of received symbols to produce a sequence of soft data element decisions" and "a correlator, receiving as input the sequence of soft data element decisions produced by the symbol de-mapper, and the re-encoded output sequence produced by the encoder, said correlator being adapted to produce a channel quality indicator output by determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence."

The Office Action alleges that ten Brink discloses a symbol de-mapper and a soft decoder, and acknowledges that ten Brink fails to disclose an encoder and a correlator. See pages 5 and 6 of the June 11, 2009 Office Action. Applicants respectfully submit that ten Brink appears to disclose providing N correlation results at the receiver that are inputted to the de-mapper. See col. 7, lines 10-14 of ten Brink. The Office Action alleges that Stein discloses a correlator that receives as input the sequence of soft data element decisions produced by the symbol de-mapper. See page 6 of the June 11, 2009 Office Action.

Stein is directed to determining the rate of received data in a variable rate communication system (see Stein, the Abstract). Stein does not teach or suggest mapping and de-mapping signals. Rather, Stein discloses a modulation and demodulation scheme (see Stain, FIGs. 1 and 2). As a result, there does not appear to be sufficient motivation to combine these references. Assuming, *arguendo*, that it is proper to combine these reference, the combination remains deficient because ten Brink discloses placing the correlator *before* the de-mapper, so that the correlation results are *inputted* to the demapper. ten Brink does not disclose a correlator that receives as input the sequence of soft data element decisions *produced by the symbol de-mapper*. Thus, placing Stein's correlator into ten Brink's system cannot teach or suggest a correlator that receives as input the sequence of soft data element decisions *produced by the symbol de-mapper* as alleged on page 6 of the June 11, 2009 Office Action.

In view of the foregoing, the rejection under 35 U.S.C. §103(a) is improper because the Office Action improperly combines ten Brink and Stein. As discussed above, the de-mapper of ten Brink receives input from a correlator. It appears that the Office Action has selected

components from incompatible systems disclosed in ten Brink and Stein to construct the features recited in Claims 1 and 11.

The Office Action does not show, based on the references themselves, how one of ordinary skill in the art would be motivated to combine the references to arrive at Applicants' claimed invention. Applicants respectfully submit that the Office Action's "conclusion of obviousness is based on improper hindsight reasoning." MPEP §2145 X (A). "For purposes of 35 U.S.C. 103, prior art can be either in the field of applicant's endeavor or be reasonably pertinent to the particular problem with which the applicant was concerned." MPEP §2141 II (A). Put simply, one of ordinary skill in the art would not be motivated to change the fundamental arrangement of parts disclosed in ten Brink as alleged in the Office Action.

"When the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the examiner to explain why the combination of the teachings is proper." *Ex parte Skinner*, 2 USPQ2d 1788 (Bd. Pat. App. & Inter. 1986). The Office Action states that "it would have been obvious to a person of ordinary skill in the art" to use a "correlator to determine a correlation between the sequence of soft data element decisions and the re-encoded output sequence as taught by Stein in the system of Brink because the re-encoding can provide a higher rate of confidence with the received data and a correlator for correlation between sequences can indicate that no error exists in the received data frame." See pages 6 and 7 of the June 11, 2009 Office Action. In fact, while ten Brink appears on its face to disclose a correlator, this reference does not disclose determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence. The Office Action *fails to address* why one of ordinary skill in the art would change the arrangement of parts

disclosed by ten Brink to a “correlator, receiving as input the sequence of soft data element decisions *produced by the symbol de-mapper*.” As discussed above, “it is the duty of the examiner to explain why the combination of the teachings is proper.” *Ex parte Skinner*, 2 USPQ2d 1788 (Bd. Pat. App. & Inter. 1986). Applicants submit that the Examiner has failed to satisfy this duty.

The Office Action further acknowledges that ten Brink and Stein do not disclose a correlator being adapted to produce a channel quality indicator (CQI) wherein the CQI is fed back to a transmitter in determining and applying an appropriate coding rate and modulation. See page 7 of the June 11, 2009 Office Action. Dent is provided for allegedly disclosing this feature. Assuming, *arguendo*, that Dent discloses this feature, it remains that ten Brink, Stein and Dent are deficient, both alone and in combination, because they fail to teach or suggest a “symbol de-mapper being adapted to perform symbol de-mapping on said sequence of received symbols to produce a sequence of soft data element decisions” and “a correlator, receiving as input the sequence of soft data element decisions produced by the symbol de-mapper, and the re-encoded output sequence produced by the encoder, said correlator being adapted to produce a channel quality indicator output by determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence.”

In view of the foregoing differences between Claims 1, 11 and the applied references, Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness based on ten Brink in view of Stein and further in view of Dent *et al*. Thus, Applicants believe these claims are patentable and request that the rejection of these claims be withdrawn.

Dependent Claim 2, 3, 12 and 13

On page 8 of the Office Action, Claims 2, 3, 12 and 13 are rejected under 35 U.S.C. §103(a) as being obvious over ten Brink and Stein in view of Dent *et al.* and further in view of Jones *et al.* (U.S. Patent #: 6,215,813). Applicants respectfully traverse this rejection.

Claims 2, 3, 12 and 13 depend from corresponding ones of independent Claims 1 and 11 and therefore include the features of, among other things, a “symbol de-mapper being adapted to perform symbol de-mapping on said sequence of received symbols to produce a sequence of soft data element decisions” and “a correlator, receiving as input the sequence of soft data element decisions produced by the symbol de-mapper, and the re-encoded output sequence produced by the encoder, said correlator being adapted to produce a channel quality indicator output by determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence.”

As discussed above, ten Brink, Stein and Dent are deficient, both alone and in combination, because they fail to teach or suggest these features of independent Claims 1 and 11. The Office Action further acknowledges that ten Brink, Stein and Dent are deficient because they fail to teach or suggest that the “symbol de-mapper is adapted to perform QPSK symbol de-mapping and Euclidean distance”. See page 8 of the June 11, 2009 Office Action. The Office Action alleges that Jones discloses a symbol de-mapper adapted to perform QPSK symbol de-mapping and least squared Euclidean distance to the transmission symbol from the received symbol. See page 8 of the June 11, 2009 Office Action.

Assuming, *arguendo*, that Jones discloses this feature, it remains that ten Brink, Stein, Dent and Jones are deficient, both alone and in combination, because they fail to teach or suggest

a “symbol de-mapper being adapted to perform symbol de-mapping on said sequence of received symbols to produce a sequence of soft data element decisions” and “a correlator, receiving as input the sequence of soft data element decisions produced by the symbol de-mapper, and the re-encoded output sequence produced by the encoder, said correlator being adapted to produce a channel quality indicator output by determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence.”

In view of the foregoing differences between Claims 1, 2, 3, 11, 12, 13 and the applied references, Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness based on ten Brink and Stein in view of Dent et al and further in view of Jones *et al.* Thus, reconsideration and allowance of Claims 2, 3, 12 and 13 are respectfully requested.

Dependent Claims 4, 7 and 14

On page 8 of the Office Action, Claim 4 is rejected under 35 U.S.C. §103(a) as being obvious over ten Brink and Stein and further in view of Dent *et al.* On page 11 of the Office Action, Claim 7 is rejected under 35 U.S.C. §103(a) as being obvious over ten Brink in view of Stein and further in view of Dent *et al.* On page 14 of the Office Action, Claim 14 is rejected under 35 U.S.C. §103(a) as being obvious over ten Brink in view of Stein and further in view of Dent *et al.* Applicants respectfully traverse these rejections.

Independent Claims 4, 7 and 14 recite, among other things, “symbol de-mapping said sequence of received symbols to produce a sequence of soft data element decisions” and “correlating said re-coded output sequence, and said sequence of soft data element decisions to produce a channel quality indicator output.”

The Office Action relies on ten Brink for disclosing a symbol de-mapper and acknowledges that ten Brink and Stein are deficient because they fail to disclose correlating re-encoded sequence of soft data element decisions to produce a channel quality indicator output. See pages 9, 12 and 15 of the June 11, 2009 Office Action. The Office Action relies on Dent to overcome this deficiency of ten Brink and Stein. In particular, the Office Action alleges that “Dent discloses correlator correlating encoded sequence to produce a channel quality indicator.” See pages 9, 12 and 15 of the June 11, 2009 Office Action.

The Office Action fails to address the feature of Claims 4, 7 and 14 reciting “correlating said re-encoded output sequence, and said *sequence of soft data element decisions* to produce a channel quality indicator.” (emphasis added). Claims 4, 7 and 14 further recite “symbol de-mapping said sequence of received symbols to *produce a sequence of soft data element decisions*.” (emphasis added). ten Brink discloses placing the correlator *before* the de-mapper, so that the correlation results are *inputted* to the demapper. ten Brink does not disclose a correlator that receives as input the sequence of soft data element decisions *produced by the symbol de-mapper*. Thus, placing Stein’s correlator into ten Brink’s system cannot teach or suggest correlating the re-encoded output sequence, and the sequence of soft data element decisions to produce a channel quality indicator as alleged on page 9 of the June 11, 2009 Office Action. Dent fails to overcome the deficiencies of ten Brink and Stein. As a result, ten Brink, Stein and Dent fails to teach or suggest correlating said re-encoded output sequence, and said *sequence of soft data element decisions* to produce a channel quality indicator.

In view of the foregoing differences between Claims 4, 7, 14 and the applied references, Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of

obviousness based on ten Brink in view of Stein and further in view of Dent *et al.* Thus, reconsideration and allowance of Claims 4, 7 and 14 are respectfully requested.

Dependent Claims 5, 6, 15 and 16

On page 10 of the Office Action, Claims 5, 6, 15 and 16 are rejected under 35 U.S.C. §103(a) as being obvious over ten Brink and Stein in view of Dent *et al.* and further in view of Jones *et al.* Applicants respectfully traverse this rejection.

Claims 5, 6, 15 and 16 depend from corresponding ones of independent Claims 4 and 14 and therefore include the features of, among other things, “symbol de-mapping said sequence of received symbols to produce a sequence of soft data element decisions” and “correlating said re-coded output sequence, and said sequence of soft data element decisions to produce a channel quality indicator output.”

As discussed above, ten Brink, Stein and Dent are deficient, both alone and in combination, because they fail to teach or suggest these features of independent Claims 4 and 14. The Office Action further acknowledges that ten Brink, Stein and Dent are deficient because they fail to teach or suggest that the “symbol de-mapper is adapted to perform QPSK symbol de-mapping and Euclidean distance”. See page 10 of the June 11, 2009 Office Action. The Office Action alleges that Jones discloses a symbol de-mapper adapted to perform QPSK symbol de-mapping and least squared Euclidean distance to the transmission symbol from the received symbol. See page 10 of the June 11, 2009 Office Action.

Assuming, *arguendo*, that Jones discloses this feature, it remains that ten Brink, Stein, Dent and Jones are deficient, both alone and in combination, because they fail to teach or suggest a “symbol de-mapping said sequence of received symbols to produce a sequence of soft data

element decisions” and “correlating said re-coded output sequence, and said sequence of soft data element decisions to produce a channel quality indicator output.”

In view of the foregoing differences between Claims 4, 5, 6, 14, 15, 16 and the applied references, Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness based on ten Brink and Stein in view of Dent et al and further in view of Jones *et al.* Thus, reconsideration and allowance of Claims 5, 6, 15 and 16 are respectfully requested.

Dependent Claims 8-10

On page 12 of the Office Action, Claims 8-10 are rejected under 35 U.S.C. §103(a) as being obvious over ten Brink and Stein in view of Dent *et al.* and further in view of Thomas (U.S. Publication #: 2002/0051498). Applicants respectfully traverse this rejection.

Claims 8-10 depend from independent Claim 7 and therefore include the features of, among other things, “symbol de-mapping said sequence of received symbols to produce a sequence of soft data element decisions” and “correlating said re-coded output sequence, and said sequence of soft data element decisions to produce a channel quality indicator output.”

As discussed above, ten Brink, Stein and Dent are deficient, both alone and in combination, because they fail to teach or suggest these features of independent Claim 7. The Office Action further acknowledges that ten Brink, Stein and Dent are deficient because they fail to teach or suggest that the “symbol de-mapper is adapted to perform QPSK symbol de-mapping and Euclidean distance”. See page 12 of the June 11, 2009 Office Action. The Office Action alleges that Thomas discloses a symbol de-mapper adapted to perform QPSK symbol de-

mapping and least squared Euclidean distance to the transmission symbol from the received symbol. See page 12 of the June 11, 2009 Office Action.

Regarding Claim 9, the Office Action acknowledges that ten Brink, Stein and Dent are deficient because they fail to teach or suggest that the “sequence of received symbols comprises Euclidean distance conditional LLR de-mapping”. See page 13 of the June 11, 2009 Office Action. The Office Action alleges that Thomas discloses a sequence of received symbols comprises Euclidean distance conditional LLR de-mapping. See page 13 of the June 11, 2009 Office Action.

Regarding Claim 10, the Office Action acknowledges that ten Brink, Stein and Dent are deficient because they fail to teach or suggest “decoding of sequence of soft data element decisions to produce output sequence further comprises using a history of the soft data element decisions, and using information about encoding of the sequence of symbols transmitted over the channel”. See page 13 of the June 11, 2009 Office Action. The Office Action alleges that Thomas discloses decoding of sequence of soft data element decisions to produce output sequence further comprises using a history of the soft data element decisions, and using information about encoding of the sequence of symbols transmitted over the channel. See pages 13 and 14 of the June 11, 2009 Office Action.

Assuming, *arguendo*, that Thomas discloses these features, it remains that ten Brink, Stein, Dent and Thomas are deficient, both alone and in combination, because they fail to teach or suggest a “symbol de-mapping said sequence of received symbols to produce a sequence of soft data element decisions” and “correlating said re-coded output sequence, and said sequence of soft data element decisions to produce a channel quality indicator output.”

In view of the foregoing differences between Claims 7-10 and the applied references, Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness based on ten Brink and Stein in view of Dent et al and further in view of Thomas. Thus, reconsideration and allowance of Claims 8-10 are respectfully requested.

Independent Claim 36 and Dependent Claim 37

On page 16 of the Office Action, Claims 36 and 37¹ are rejected under 35 U.S.C. §103(a) as being obvious over Zhu *et al.* (U.S. Patent #: 7,085,314) in view of Tiedemann *et al.* (U.S. Publication #: 2006/0094460). Applicants respectfully traverse this rejection.

Independent Claim 36 recites, among other things, “re-encoding the recovered fast signaling message so as to produce known pilot symbols in the scattered pilot pattern” and “determining a channel response for the encoded symbols using decision feedback”. The Office Action acknowledges that Zhu et al. fails to teach or suggest these features. Applicants respectfully assert that Tiedemann also does not teach or suggest at least the “re-encoding” feature.

The Office Action alleges that Tiedemann discloses “re-encoding the fast signaling message so as to generate pilot symbols in the scattered pattern (page 3, section 0044, lines 13-29)”. See page 16 of the June 11, 2009 Office Action. This portion of Tiedemann discloses using a pilot signal to extract a timing signal that is provided to the traffic demodulator 43. See Tiedemann, paragraph [0044], lines 8-13. Tiedemann discloses that decoder 44 decodes the demodulated traffic signal and then re-encodes the decoded traffic signal. See Tiedemann, paragraph [0044], lines 23-25 and FIG. 2. Tiedemann does not teach or suggest re-encoding the

¹ Claim 37 is omitted from summary paragraph 11 in the Office Action, but is discussed in the body of the rejection. As a result, Applicants assume Claim 37 was rejected.

recovered fast signaling message so as to *produce known pilot symbols* in the scattered pilot pattern. Thus, Tiedemann is deficient. Claim 36 is believed patentable for at least this reason.

Additionally, the Office Action alleges that Tiedemann discloses “determining a channel response for the encoded symbols using decision (compares the re-encoded symbols with the demodulated signal to obtain an estimate to control processor) feedback (page 3, section 0044, lines 20-29, section 0045).” See page 16 of the June 11, 2009 Office Action. Tiedemann fails to teach or suggest using decision feedback. Rather, Tiedemann simply discloses comparing the re-encoded traffic signal with the demodulated traffic signal to obtain an estimate of the channel symbol error rate. As such, neither Zhu et al. nor Tiedemann teaches or suggests the above-described feature.

In view of the foregoing differences between Claim 36 and the applied references, Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness based on Zhu et al. in view of Tiedemann, Jr. et al. Thus, reconsideration and allowance of Claim 36 are respectfully requested. Claim 37 depends from Claim 36 and is therefore allowable at least by virtue of its dependency.

Independent Claim 40 and Dependent Claim 41

On page 17 of the Office Action, Claims 40 and 41 are rejected under 35 U.S.C. §103(a) as being obvious over Walton et al. (U.S. Publication #: 2006/0105761). Applicants respectfully traverse this rejection.

Independent Claim 40 recites, among other things, that “a set of transmission parameter signalling symbols are transmitted by the at least one transmit antenna on the overhead channel with strong encoding performed by the encoder such that at a receiver, they can be decoded

accurately, re-encoded, and the re-encoded symbols treated as known pilot symbols which can then be used for channel estimation.” This feature is not taught or suggested by Walton et al.

Walton discloses that pilot data may be encoded and multiplexed with the processed information bits in all or a subset of the transmission channels used to transmit information bits. See Walton at paragraph [0112]. The Office Action alleges that overhead channels are equivalent to data channels. Applicants submit that overhead channels are different than transmission channels used for data transmission. In particular, overhead channels are used to transmit overhead/parameter signaling symbol signals as opposed to data signals. Overhead, by its very definition is generally known to refer to information other than data. Thus, Walton is deficient at least because it fails to teach or suggest that a set of transmission parameter signalling symbols are transmitted by the at least one transmit antenna on the overhead channel.

Independent Claim 41 recites, among other things, a receiver adapted to utilize the encoder to re-encode the decoded symbols to produce known pilot symbols.

The Office Action alleges that Walton discloses this feature at page 9, paragraphs [0100], [0101]; page 10, paragraphs [0103], [0104]; and page 11, paragraphs [0112-0114]. See page 18 of the June 11, 2009 Office Action. However, these portions of Walton do not teach or suggest re-encoding. While Walton may appear to disclose re-encoding a decoded *data stream* to estimate the channel response (see Walton at paragraph 0128), Walton fails to teach or suggest a receiver adapted to utilize the encoder to re-encode the decoded symbols *to produce known pilot symbols*. Claim 41 is believed patentable at least for this reason and by virtue of its dependency on independent Claim 40, which is believed patentable as discussed above.

In view of the foregoing differences between Claims 40, 41 and the applied references, Applicants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness based on Walton et al. Thus, reconsideration and allowance of Claims 40 and 41 are respectfully requested.

Applicants thank the Examiner for the allowance of Claims 18-32, 34 and 35.

For all of the above reasons, the claim rejections are believed to have been overcome placing Claims 1-16, 36-38, 40 and 41 in condition for allowance. Reconsideration and allowance thereof are respectfully requested.

The Examiner is encouraged to telephone the undersigned attorney to discuss any matter that would expedite allowance of the present application.

The Commissioner is hereby authorized to credit overpayments or charge payment of any additional fees associated with this communication to Deposit Account No: **141315**.

Respectfully submitted,

Date: October 12, 2009

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